

Probably one or two disagreeable months in the year have no particular effect on the well-being of the settler—but let us follow the 6-months isopleth on the map. It runs along the Queensland coast north of Mackay, sweeps to the north of the Atherton Tableland (that most promising region in our tropics!); along the Gulf coast, through Daly Waters, and along to Roeburne, W. A.

This line is no fanciful creation but is a definite climatological boundary. Yet I should point out that the unfavorable zone thus marked out is not all of one type. Another factor comes in which, luckily, greatly ameliorates conditions on the Queensland coast. Here blow the steadiest onshore winds in the world—the Southeast Trades. A high wet-bulb temperature, if accompanied by a fresh breeze, is robbed of half its terrors. Unfortunately the effect of local winds on health and comfort has not been investigated in our tropics, and my own experience is limited to the Queensland coast.

Having shown that the 6-months isopleth on the map has a real climatological value, what bearing has it on the settlement of our tropics? It will be noticed that it is precisely the low-lying river alluvials which are adversely affected. Here irrigation may ultimately be possible, for there are many truly fine rivers running into our northern seas. But I doubt if a white farming community will settle in these suitable areas for very many years, and this brings me to the last section of this article.

I have found it a comparatively simple matter (by means of diagrams which I have called climographs) to compare very closely the climatological conditions in our tropical towns with conditions obtaining in other parts of the world. Thus Darwin has the same climate as Cuttack, in India; Broome is like the mouth of the Congo; Townsville resembles Calcutta closely.²

Assuming that these and similar parallels are correct, we see that the analogous regions (homoclimes) for Darwin are settled by Siamese, Indians, and Bantu blacks, and in northern Brazil by half-caste Portuguese. Wyndham (the hottest of all moist climates recorded), has for homoclime only the extreme tip of India. Broome's homoclime is settled by Bantu.

Only in the inland country like that around Tennant's Creek, have we a homoclime even sparsely settled by north Europeans. This is the recently conquered German territory of Southwest Africa.

In eastern Brazil is a most interesting series of settlements; but the Germans have settled in the homoclime of Grafton; the Italians in Brazilian "Brisbane," and only the Spanish emigrants touch even the coolest tropical regions.

We learn, therefore, from our brief but comprehensive climatological study that Australia is ahead in tropical settlement as in other sociological experiments. Her white sugar growers around Cairns and Mourilyan are the advance guard of the white farmer in the Tropics.

I have no space to do more than mention one great asset in our northern lands—their remarkable freedom from such scourges as yellow fever, beri-beri and malaria. There seems good reason to hope that even the latter will soon be almost stamped out.

What then is indicated as regards the immediate future of our empty northern lands? I have no novel suggestions to make. The country is a pastoral one—

it is not, in my opinion, an agricultural region. Quite apart from questions of labor and market I do not think that the north coast agricultural areas are suitable for white labor at present.

I have several times in this article hinted that conditions may be more favorable in the future. In four or five generations there is reason to believe that our native born will become thoroughly acclimatized in the subtropical areas, and will gradually expand into hotter and more humid zones to the north.

Until that time arrives let us develop the pastoral industries. Let us build railways, dig wells, and sink artesian bores. Let us strengthen our naval and aerial fleets. Let us, above all, have scientific direction and a definite aim. It is the lack of these which has ever hindered British enterprise, while they have made the Germans a world-shaking power. *Fas est et ab hoste doceri.*

551.574 : 557.509

PRACTICAL HINT IN FORECASTING MINIMUM TEMPERATURES.

By WILLIAM G. REED, Meteorologist.¹

[Dated: Pomona, Cal., Dec. 16, 1917.]

Referring to the use of the Smith-Donnel method of estimating the probable minimum temperature (this REVIEW, August, 1917, pp. 405 fig.), I have tried the straight-line equation for the conditions at Pomona, Cal., and while the values of a and b were determined from insufficient data yet the method seems applicable to this locality. While a and b are most conveniently computed by Professor Smith's form of the equation (see 3, below) I suggest that in practical use the hygrometric formula be expressed as follows:

$$t_n = t_d + (a + br), \quad (1)$$

where t_n is the minimum temperature next morning, t_d is the evening dewpoint, r is the relative humidity, and a , b , are constants to be determined. Mathematically this expression is identical with

$$t_n - t_d = a + br, \quad (2)$$

which Prof. Smith has written (loc. cit., equation 1) as

$$Y = a + bR, \quad (3)$$

The advantages of the form of (1) are that the quantity sought is the only term on the left-hand side of the equation; the possible doubt as to the sign of Y , or $t_n - t_d$, is removed; and the equation represents directly what it actually is to the forecaster, viz, a means of modifying or correcting the current dewpoint so that it shall become the minimum temperature of the next morning. While there should be no doubt as to the sign of Y , in practice I have found that I have hesitated in writing the quantity, between $t_n - t_d$ and $t_d - t_n$. I believe that any change in the statement of the formula, which will make the mechanical operation automatic will be an advantage in practice.

The form of the statement by Prof. Smith is better for the study of the relationship and the theoretical development of the method; the form here suggested is intended only to minimize the chance of errors in the practical application of the relationship in actual forecasting.

² See Commonwealth Bureau of Meteorology Bulletin No. 14: Control of settlement by humidity and temperature . . . by Griffith Taylor. Melbourne, September, 1916. 22 p. 21 figs. 40.—C. A., Jr.

¹ Conducting Weather Bureau investigations into protection against frost.